FIG. 1

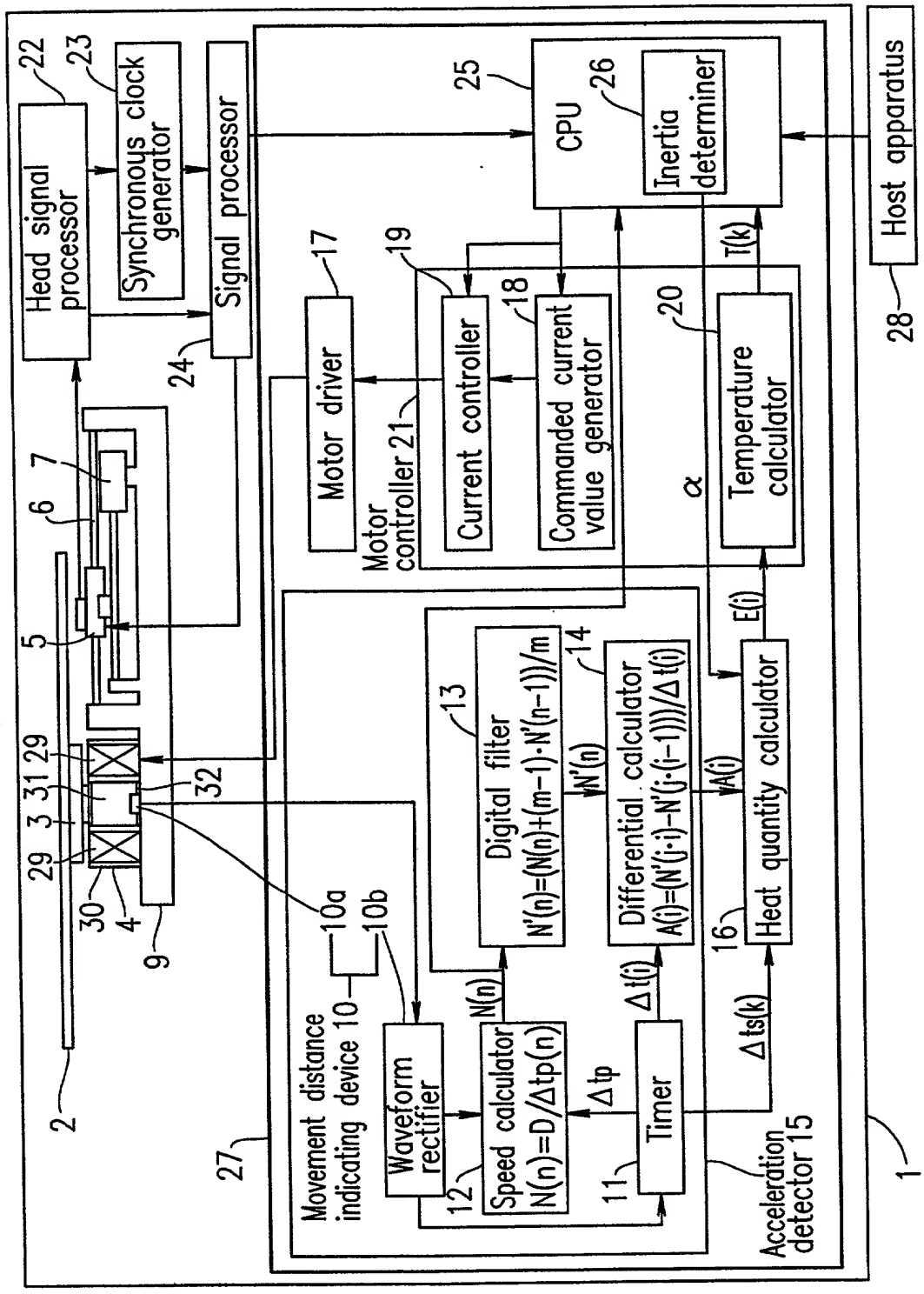
Head signal processor
22
Synchronous clock generator
23
Signal processor
24
CPU
25
26
Inertia determiner
Motor driver
17
Motor controller 21
19
Current controller
18
Commanded current value generator
20
Temperature calculator
T(k)
Host apparatus
28
Movement distance indicating device 10
10a
10b
Waveform rectifier
12
Speed calculator N(n)=D/Δtp(n)
N(n)
Δtp
Timer
11
Δt(i)
Digital filter N'(n)=(N(n)+(m−1)·N'(n−1))/m
13
14
N'(n)
Differential calculator A(i)=(N'(i·i)−N'(j·(i−1)))/Δt(i)
A(i)
16
Heat quantity calculator
E(i)
Δts(k)
Acceleration detector 15
27
1
2
3
4
5
6
7
9
29
30
31
32
α

FIG. 2

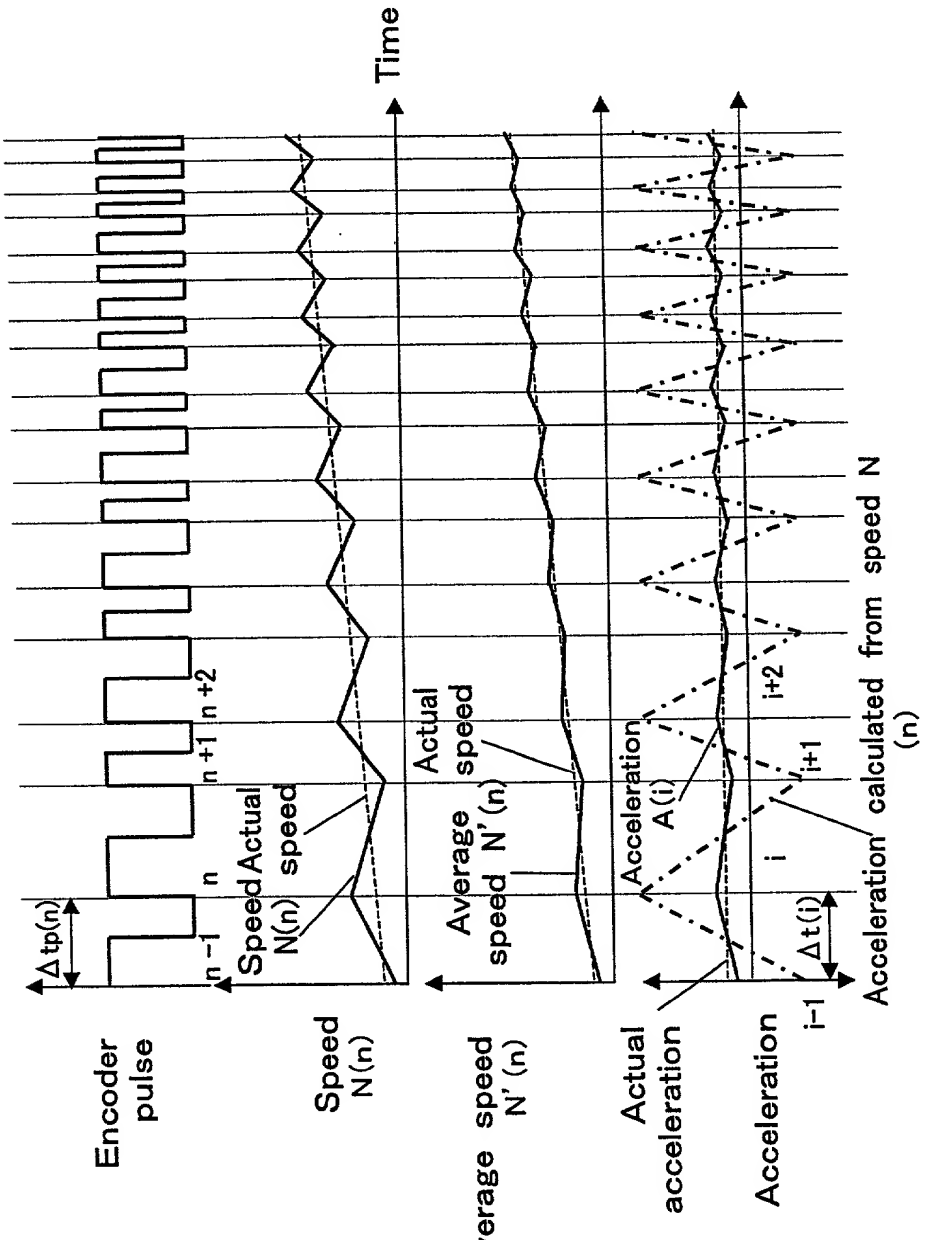
Encoder pulse
Δtp(n)
n-1
n
n+1
n+2
Speed N(n)
Actual speed
Average speed N'(n)
Actual speed
Time
Actual acceleration
Acceleration A(i)
i-1
i
i+1
i+2
Acceleration
Δt(i)
Acceleration calculated from speed N (n)

FIG. 3

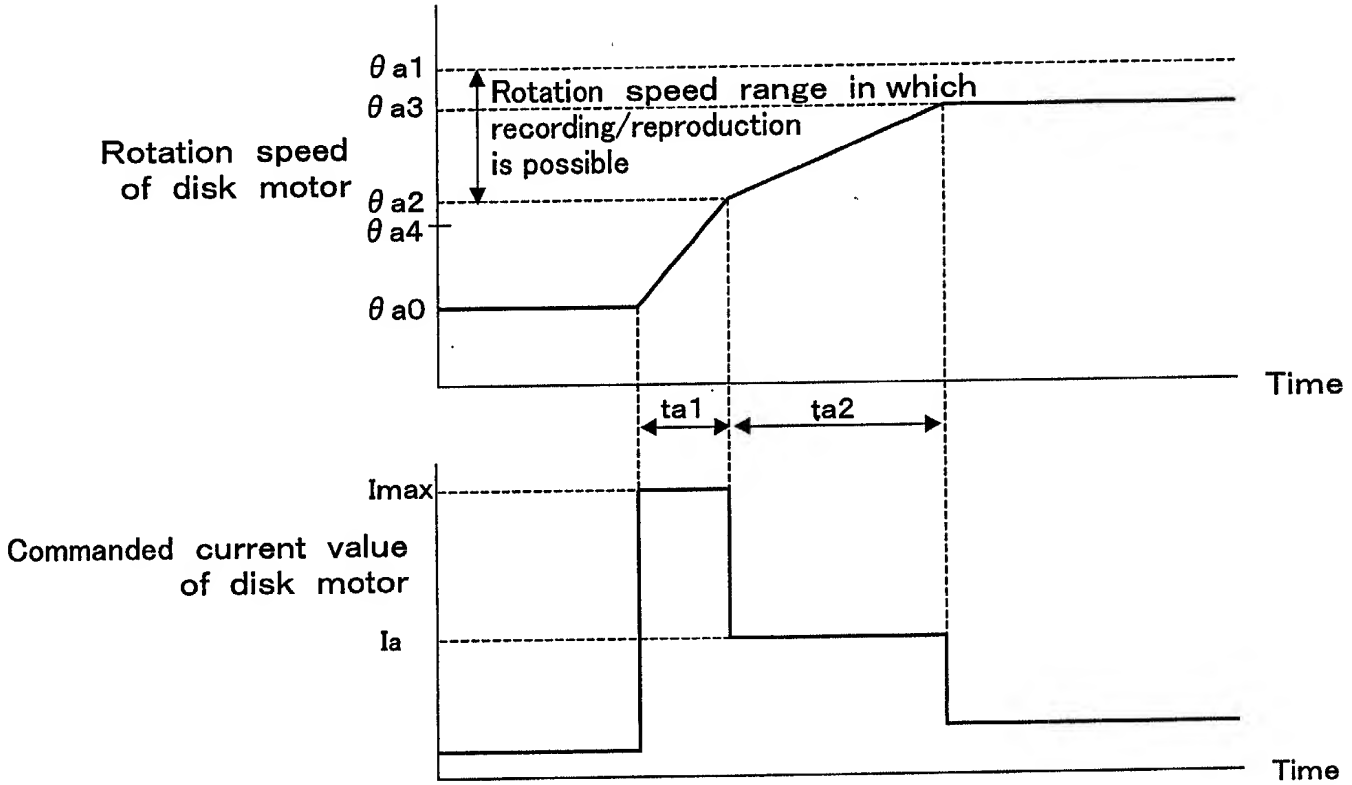
θ a1
θ a3
Rotation speed range in which recording/reproduction is possible
Rotation speed of disk motor
θ a2
θ a4
θ a0
Time
ta1
ta2
Imax
Commanded current value of disk motor
Ia
Time

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FIG. 4

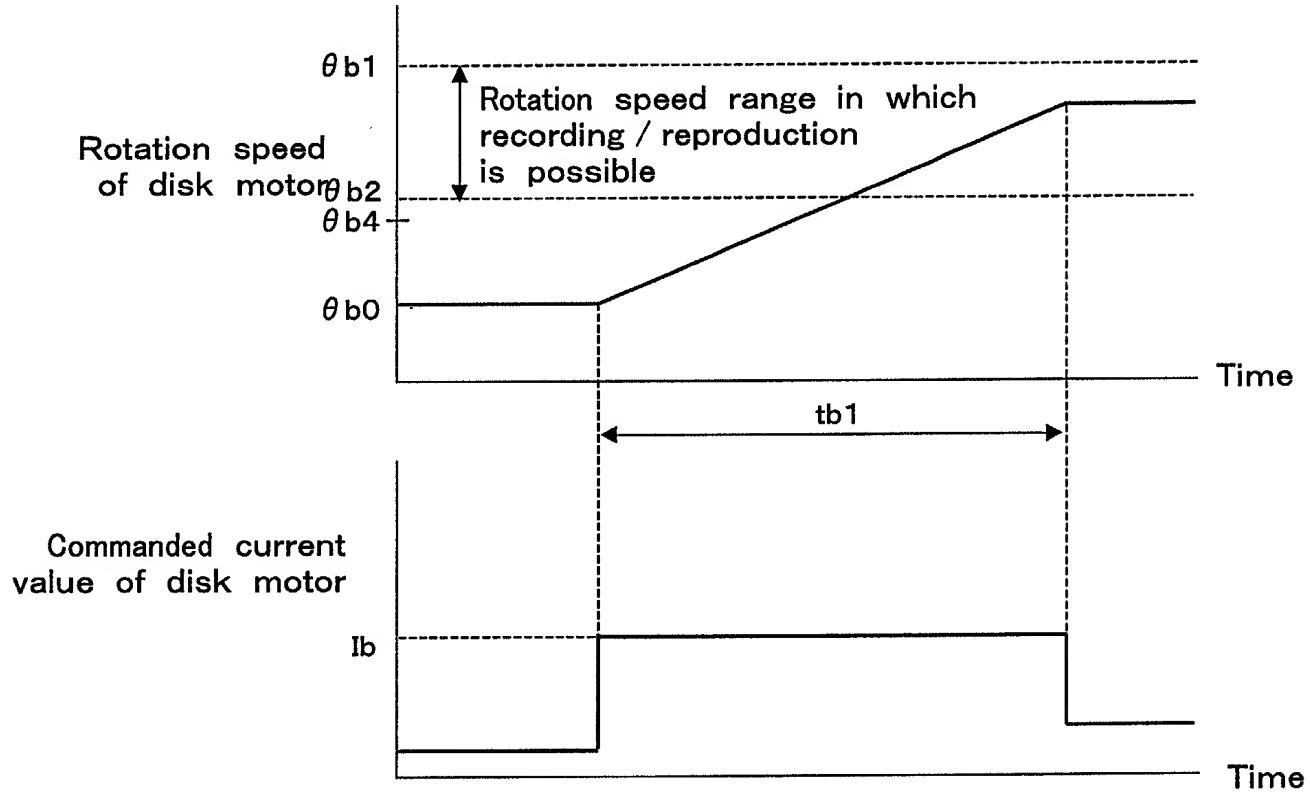
θb1
Rotation speed range in which recording / reproduction is possible
Rotation speed of disk motor
θb2
θb4
θb0
Time
tb1
Commanded current value of disk motor
Ib
Time

FIG.5

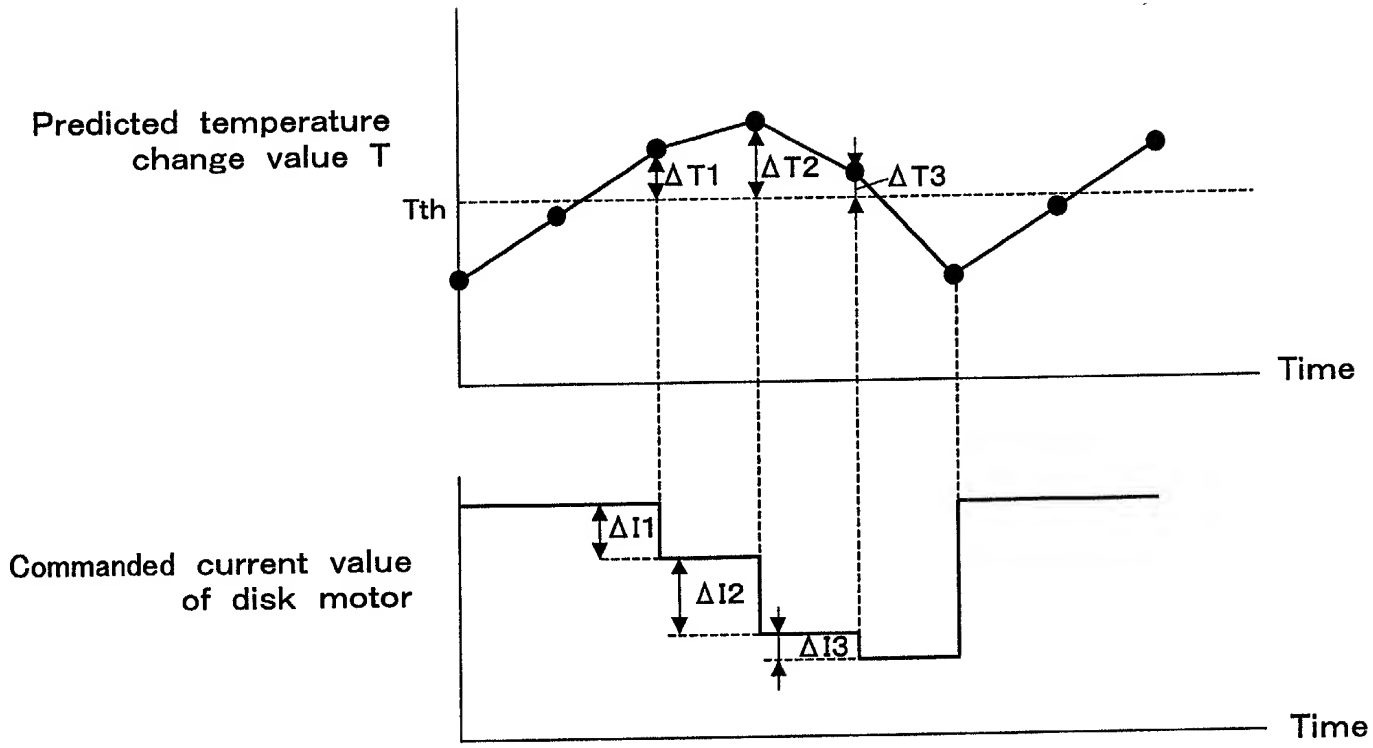
Predicted temperature change value T
Tth
ΔT1
ΔT2
ΔT3
Time
Commanded current value of disk motor
ΔI1
ΔI2
ΔI3
Time

FIG. 6

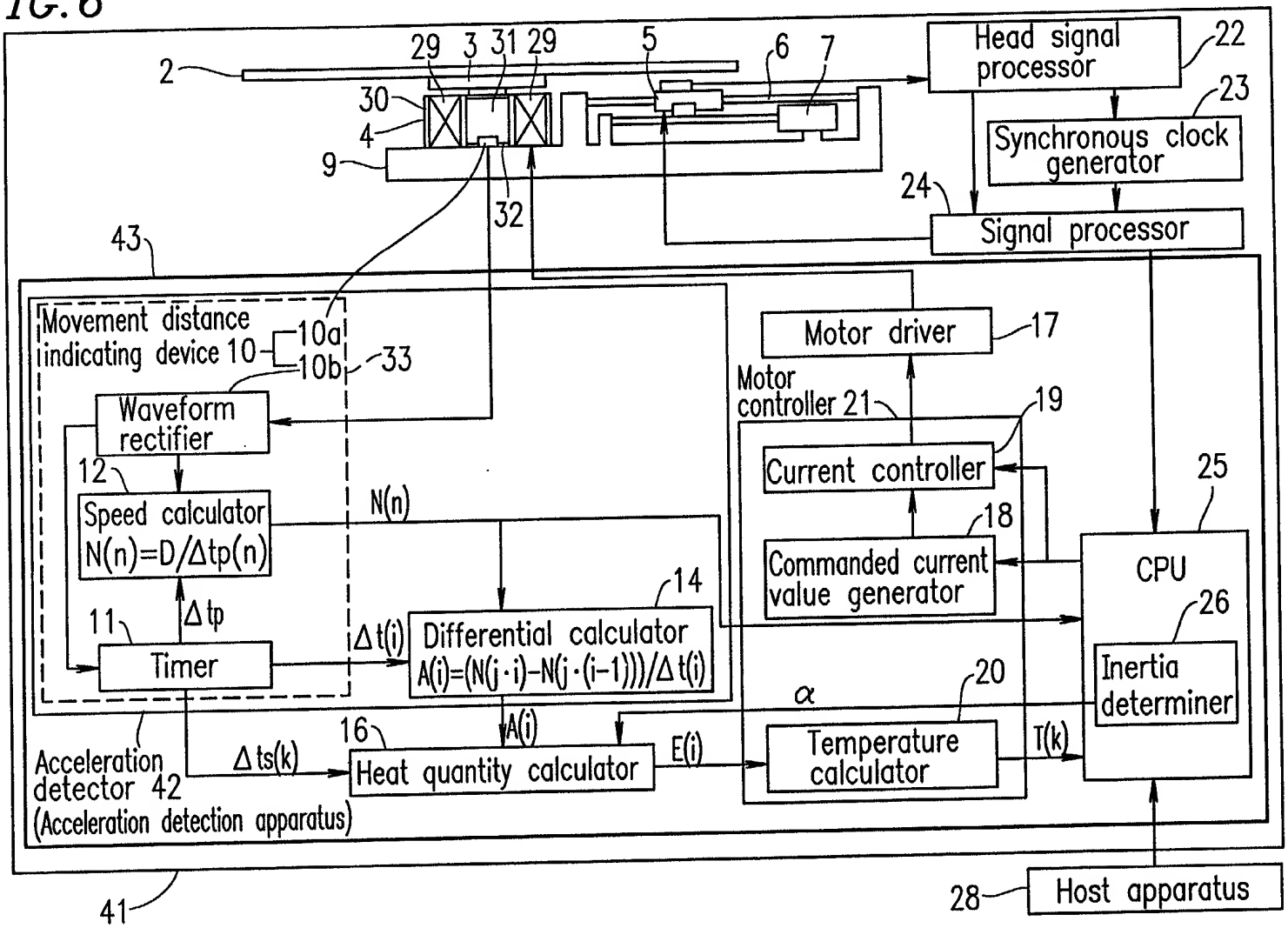
2
29
3
31
29
5
6
7
30
4
9
32
43
Head signal processor
22
23
Synchronous clock generator
24
Signal processor
Movement distance indicating device 10
10a
10b
33
Waveform rectifier
12
Speed calculator
N(n)=D/Δtp(n)
N(n)
Δtp
11
Timer
Δt(i)
Differential calculator
A(i)=(N(j·i)-N(j·(i-1)))/Δt(i)
14
Motor driver
17
Motor controller 21
19
Current controller
18
Commanded current value generator
25
CPU
26
Inertia determiner
α
20
Temperature calculator
T(k)
A(i)
16
Δts(k)
Heat quantity calculator
E(i)
Acceleration detector 42
(Acceleration detection apparatus)
41
28
Host apparatus

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FIG7

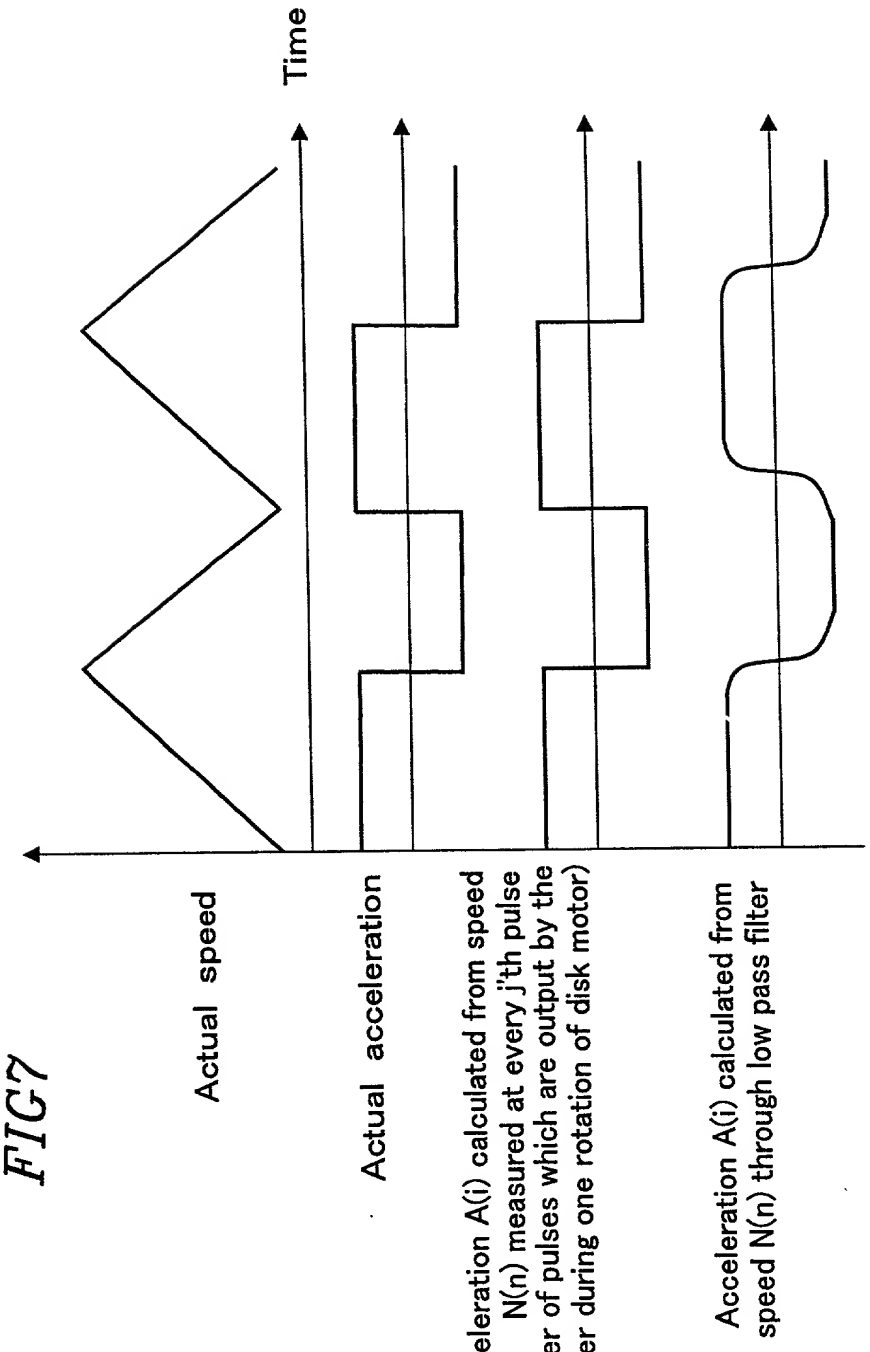

Time
Actual speed
Actual acceleration
Acceleration A(i) calculated from speed N(n) measured at every j'th pulse (j: number of pulses which are output by the encoder during one rotation of disk motor)
Acceleration A(i) calculated from speed N(n) through low pass filter

FIG. 8

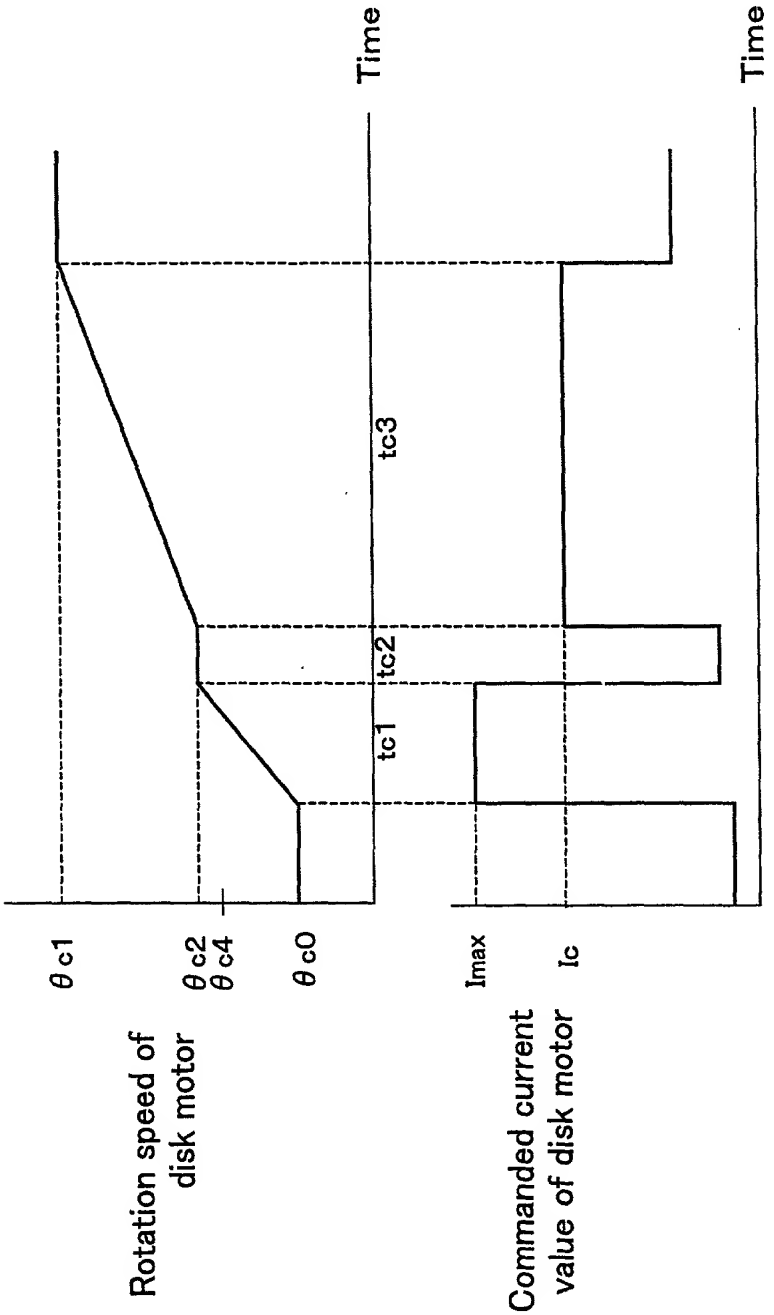

Rotation speed of disk motor
θc1
θc2
θc4
θc0
tc1
tc2
tc3
Time
Commanded current value of disk motor
Imax
Ic
Time

FIG. 9

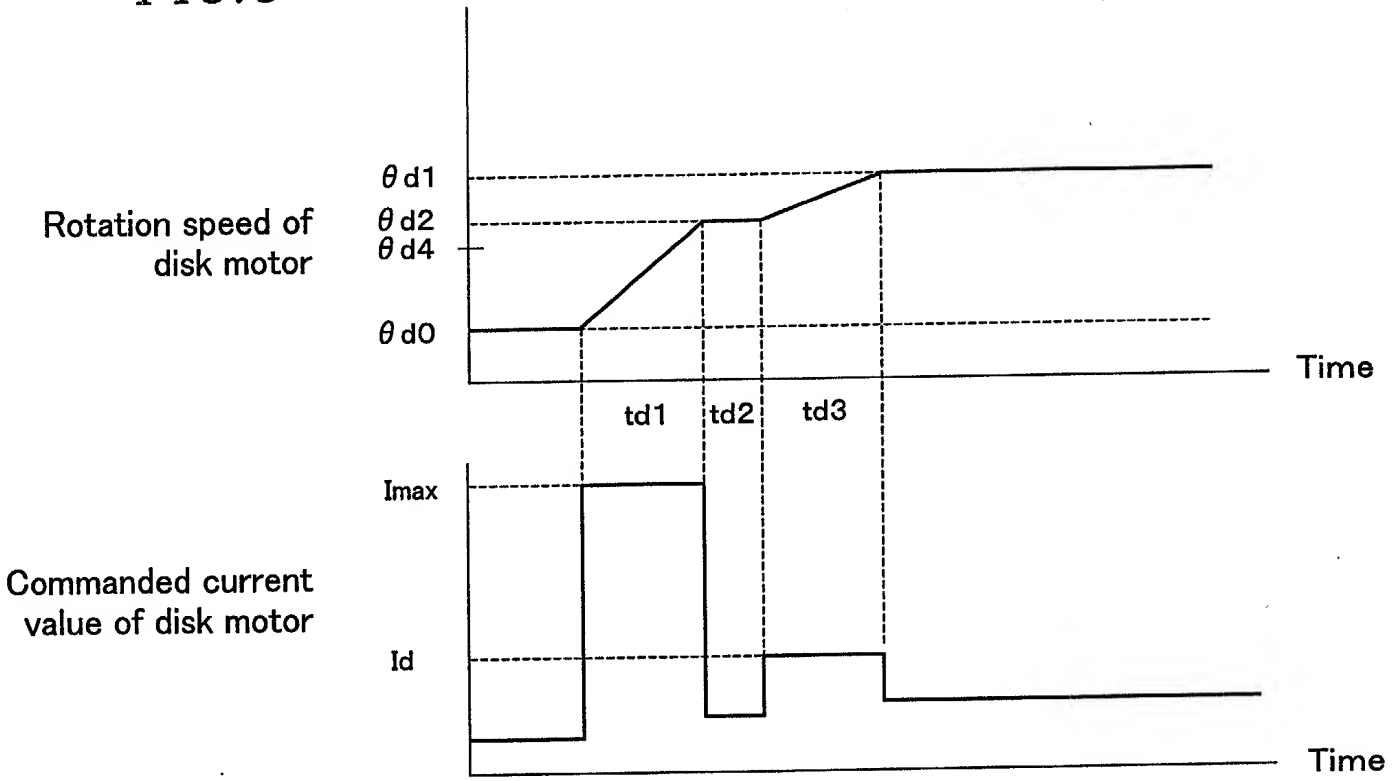
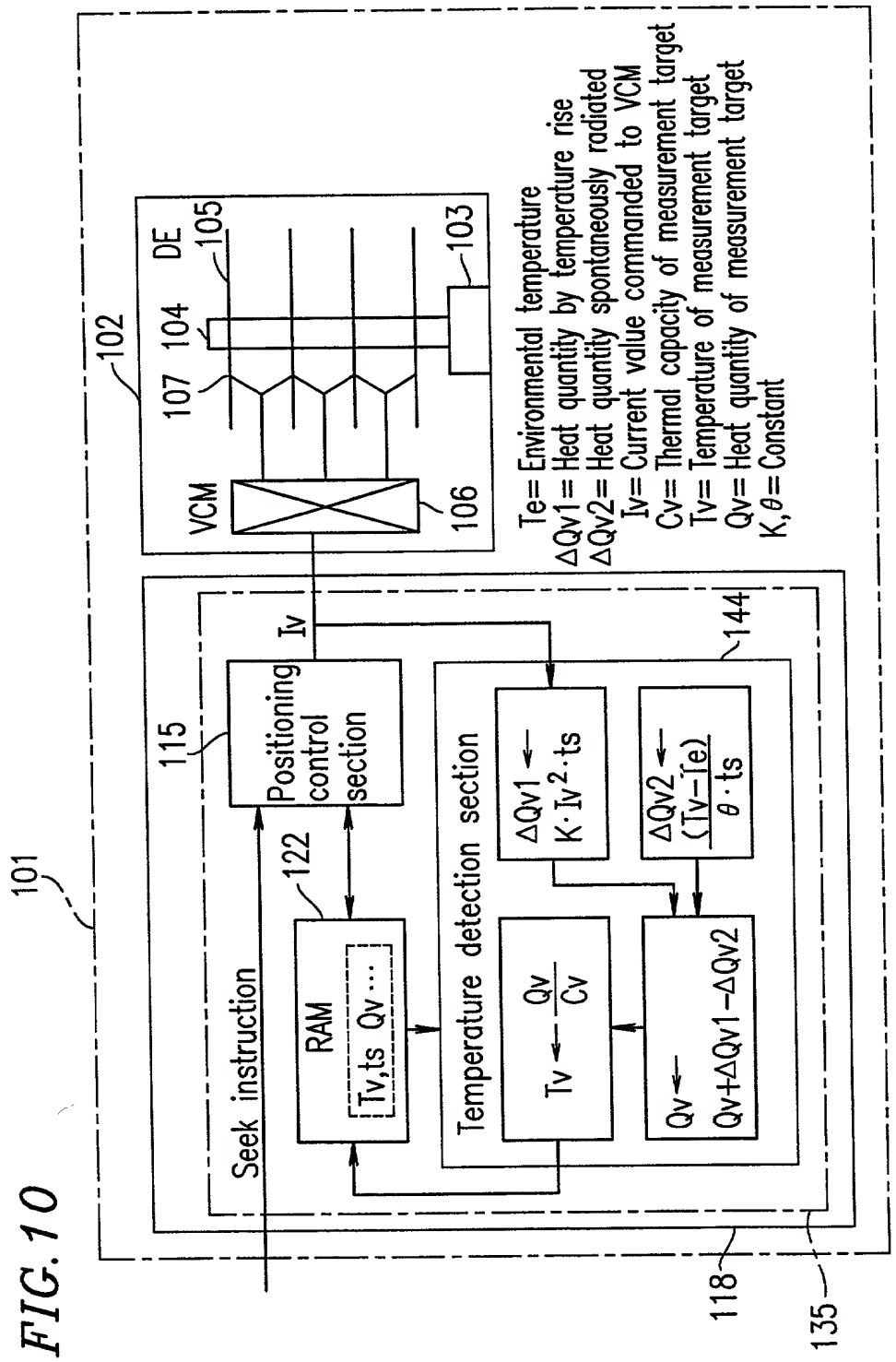

Rotation speed of disk motor
θd1
θd2
θd4
θd0
Time
td1
td2
td3
Commanded current value of disk motor
Imax
Id
Time

FIG. 10


101
102
VCM
107
104
105
DE
103
106
Te= Environmental temperature
ΔQv1= Heat quantity by temperature rise
ΔQv2= Heat quantity spontaneously radiated
Iv= Current value commanded to VCM
Cv= Thermal capacity of measurement target
Tv= Temperature of measurement target
Qv= Heat quantity of measurement target
K, θ= Constant
115
Positioning control section
Iv
Seek instruction
122
RAM
Tv,ts Qv ···
Temperature detection section
144
ΔQv1 ← K·Iv²·ts
ΔQv2 ← (Tv−Te)/θ·ts
Tv ← Qv/Cv
Qv ← Qv+ΔQv1−ΔQv2
118
135

T2620-FR2620

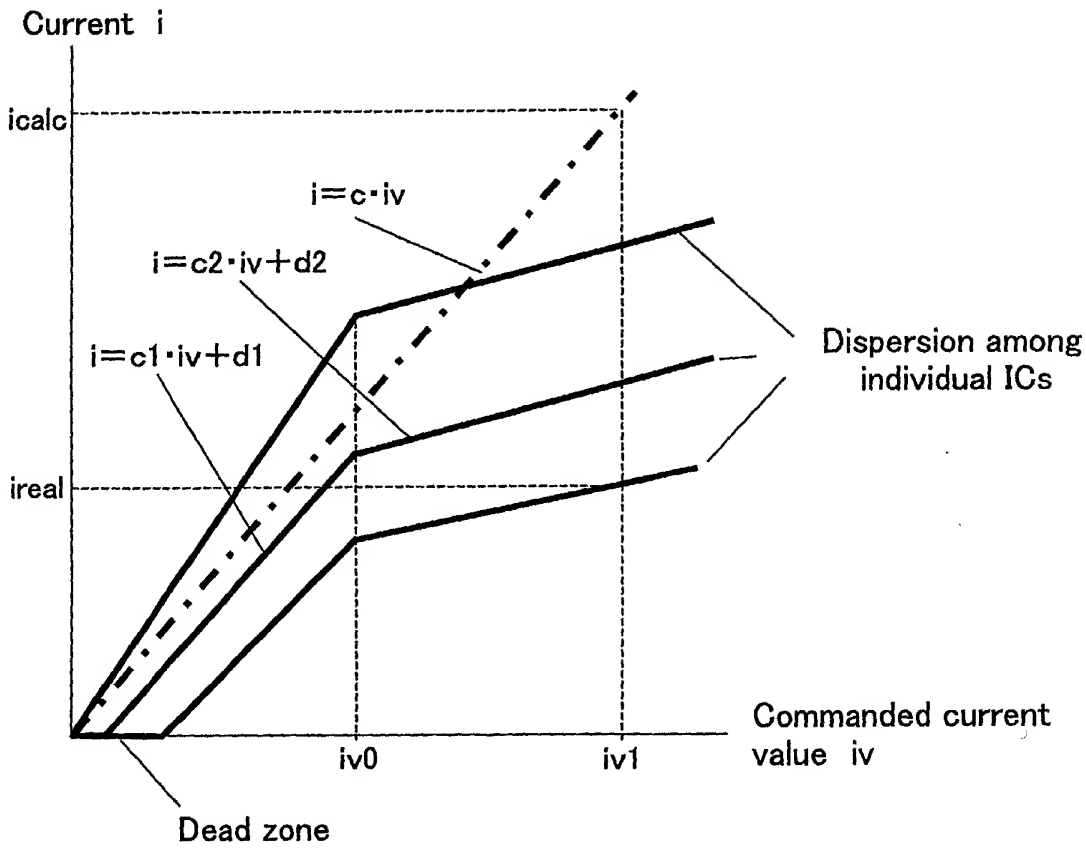



FIG. 11